Design Of 20 KL Capacity Sump at

(WITH FLAT TOP SLAB)

Not more than 5m Span

ıta

cation

ıfe bearing Capacity	sbc	safe for sbc		100	Kn/m^2	
ıpacity	v			20	KL	
ee Board	fb			0.30	m	
ıad Storage	ds			0.30	m	
a of sump	d			4.00	m	
ojection of Bottom slab from side wall			ps = d/16 to d/8	0.25	m	OK
ıpth of tank above GL	dgl	No uplift check required		1.00	m	
ıpth of Water table below GL,	wl		Safe Against Uplift	0.90	m	
ıpth of the tank	h			2.20	m	1.20
ickness of Slab	td	Min 150mm thick	OK	0.150	m	0.097 m
. Of Side wall	sth	Min 150mm thick	OK	0.150	m	0.069 m
. Of Bottom Slab	bsth	Min 150mm thick	thick is Sufficient OK	0.25	m	0.000 m

ıp Slab

						slab projection
ıdius of Top slab	rs			2.00		0.15 m
ickness of Slab	td	Min 150mm thick	OK	0.15	m	0.097 mm is required
fective depth of slab	d			100	mm	
tal Load on slab		Self wt		3.75	kN/sqm	
		Live load		1.5	kN/sqm	
		Finishings		1	kN/sqm	
	w	Total load		6.25	kN/sqm	
nding Moment	bm	(2/16*w*rs^2)		3.13	kN-m/m	
ea of Steel required	ast	(bm/(σstjd)		279	sqmm/m	
		σst	N/mm2	130.00	N/sqmm	
		j=1-k/3		0.86		
		k=1/1+σst/mσcbc		0.42		
		m=280/3σcbc		9.33		
		σcbc		10	N/sqmm	
		Grade of steel	Fe 415 , σst=	130	N/sqmm	
		Grade of Concrete	M 30			

a of Reinforcement		db	10mm				
acing	required	min of	150 mm	280 mm	floor to	10mm	
acing	provided			OK	150 mm	c/c	

Provide 10 mm dia Tor @ 150 mm C/c both radially and in the form of circular rings

de Wall

ıpth of the tank	h			2.2	m	
. Of Side wall	sth	Min 150mm thick		0.15	m	0.069 mm
ıpth of tank above GL	dgl			1.00	m	

oments

	Inner Side	1.55	Kn-m
	Outer Side	1.1	Kn-m

oop force

	Inner Side	30.72 Kn	(Tension)
	Outer Side	18.11 Kn	(Compression)

einforcement

				Dia	Spacing Provided	floor to	
ner face	Vertical	(Min 10mm dia)	240 mm^2	10 mm	150 mm	50	
	Horizontal		180 mm^2	10 mm	150 mm	50	
uter face	Vertical	(Min 10mm dia)	240 mm^2	10 mm	150 mm	50	
	Horizontal		180 mm^2	10 mm	150 mm		

ottom slab Min 150mm thick

ıfe bearing Capacity	sbc			100	Kn/m^2	
. Of Bottom Slab	bsth		thick is Sufficient	0.250	m	0.000 m
a of Bottom Slab	dbs			4.80	m	
ze of Haunch	bh			0.25	m	
fective cover to reinforcement for raft slab			covraft	65	mm	
oments Radial				2.49	Kn-m	
Circumferential				2.39	Kn-m	

					Dia	Spacing Provided	floor to	
			Ast (Min 10mm dia)					
einforcemer Top	mesh		300 mm^2		10 mm	225 mm	25	150
Bottom	mesh		300 mm^2		10 mm	200 mm	50	200

rovide 10 mm dia TOR @ 150 mm C/c on both faces in staggered fashion

esign Of Bottom Slab

ASE-1

rojection from side wall	ps			0.25	m	
a of Bottom Slab	dbs	d+2*sth+2*ps		4.80	m	
ze of Haunch	bh			0.25	m	
a of Bar top	dbbs			10	mm	
bottom	dbbsb			10	mm	

et Load on Bottom Slab

t of Top Slab		pi/4*(d+sth+topproj)^2*td*25		62.32	Kn	
t Of Side wall		pi*(d+sth)*sth*(h-dtrb)*25		97.78	Kn	
t of Haunch		pi*(d-bh)*bh^2/2*25		9.21	Kn	
otal Load	wbs			169.31	Kn	
on TOP slab		pi/4*(d+sth+topproj)^2*LL		36.30	Kn	
				2.056	sq m	0.158
ffective foundation width of sidewall load on bottom slab, ewf			ps+sth+bh+bsth=	0.900	m	
ax Pr on Soil	prb	Wbs/(pi*(d+sth)*ewf)		14.43	Kn/m^2	

ottom Slab is designed as circular Slab loaded with UDL and Simply Supported on edges

			r	2.075		1.95
adial moment	mri	3/16*prb*((dbs/2)^2-((d+sth)/2)^2)-wbs/(8*pi)*(2*l		-2.49	mrb	-2.38 Kn-m
ircuferential Moment	mti	1/16*prb*(3*(dbs/2)^2-((d+sth)/2)^2)-wbs/(8*pi)*(2		-2.39	mtb	-2.38 Kn-m
lax Radial Moment	mr	IF(wl>hbgl,0,CEILING(3*prb*(dbs/2)^2/16,0.01))		2.49	Kn-m	
lax Circumferential mon	mt	IF(wl>hbgl,0,CEILING(prb*(dbs/2)^2/16,0.01))		2.39	Kn-m	

ase Slab Th for Uncracked Condition

h	bsthr	IF(mr=0,sth*1000,(max(mr,mt)*6*10^6/(2*10^3))^	0.087	m	
			Provided th is Sufficient		
ff Depth	de	bsth*1000-covraft	185	mm	
rea of Steel					
lin Steel	Astmin	0.24	0.24	%	
			300	mm^2	
rea of Steel	Astr	mr*10^6/(130*.87*de)	121	mm^2	
pacing					
op Steel	Astlp	pi*(dbbs^2/4)*1000/max(Astmn,astr)	262	mm	
rovide 10 mm dia TOR @ 225 mm c/c in the form of mesh at top					
ottom Steel	Astb	pi*(dbbsb^2/4)*1000/(Astmin)	262	mm	
rovide 10 mm dia TOR @ 200 mm c/c in the form of mesh at bottom					

heck For SBC

oad from tank Portion	wbs		169.31	Kn	
Veight of Bottom Slab	wbsi	pi*(dbs^2/4)*bsth*25	113.1	Kn	
Veight of water	ww	pi*(d^2/4)*h*10	276.46	Kn	
otal	W	wbs+wbsi+ww	558.87	Kn	
r on Soil	pr s	w/(pi*dbs^/4) safe for sbc	30.89	Kn/m^2	

ASE-2

ottom Slab is designed as circular Slab loaded with Uplift and continuous Supported on edges

oad on Bottom Slab (Uplift)

lax Pr on Soil	pru	10*(h-dgl-wl)-bsth*25	No uplift check rec	0.00	Kn/m^2	
			r	2.075		
adial moment	mru	2/16*pru*(r)^2		0		
ircuferential Moment	mtu	1/16*pru*(r)^2		0		

ase Slab Th for Uncracked Condition

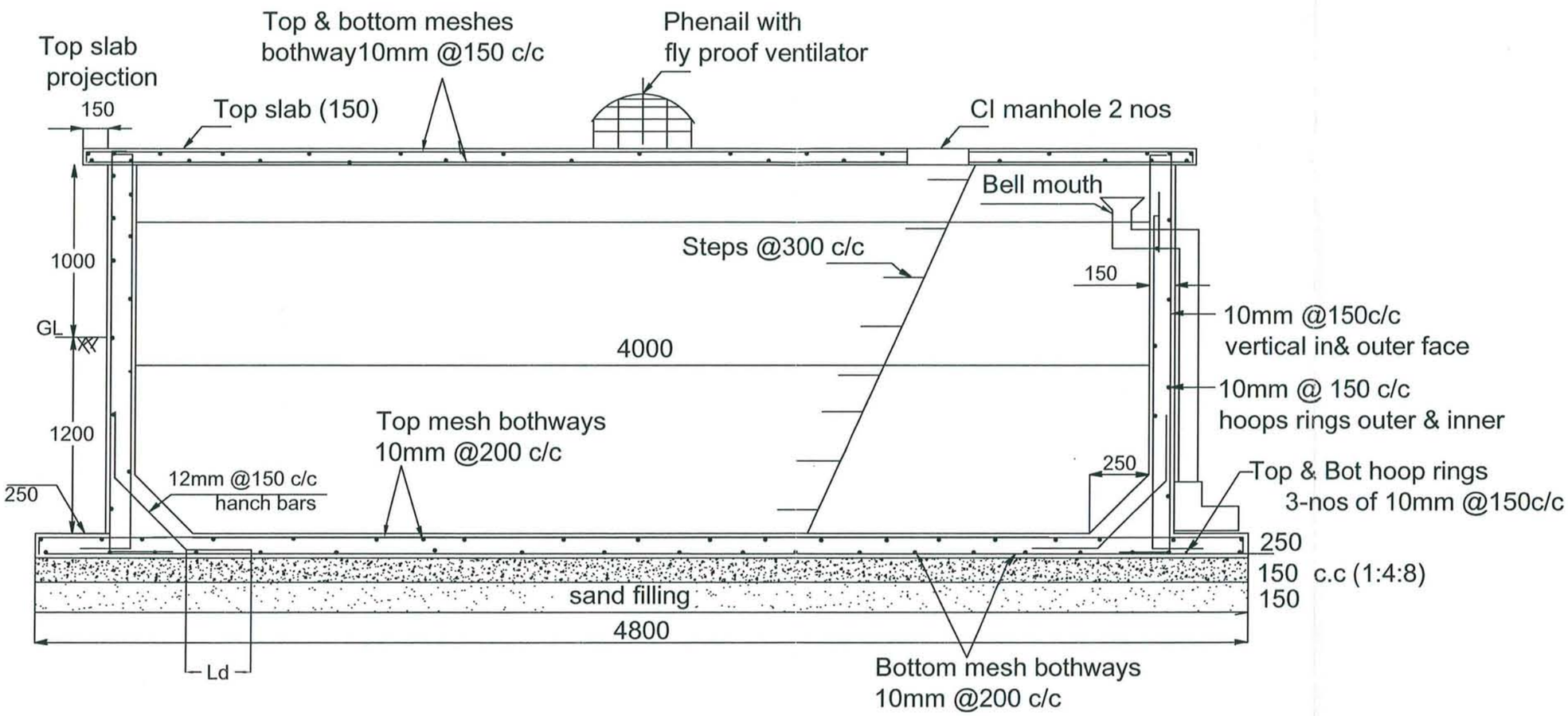
h	bsthr	IF(mru=0,sth*1000,(max(mr,mt)*6*10^6/(2*10^3))	0	m	
			thick is Sufficient		
ff Depth	de	bsth*1000-covraft	185	mm	
rea of Steel					
lin Steel	Astmin	0.24	0.24	%	

Asst. Executive Engineer
TDWSP Asifabad

Dy. Executive Engineer
TDWSP Asifabad

Executive Engineer
TDWSP Asifabad

20KL SUMP



All dimenstions are in 'mm'
Concrete mix V.R.C.C M30
Steel Fe-415
Reinforcement details shall be as per IS-SP34

Asst. Executive Engineer
AEE/TDWSP/ASF
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Dy. Executive Engineer
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Executive Engineer
TDWSP Asifabad

"APPROVED"
SE, TDWSP
NIRMAL

LARSEN & TOUBRO LIMITED Construction - Chennai

REV.NO.	DESCRIPTION	DESIGNED	DRAWN	CHECKED	APPROVED
A	FOR INFORMATION				

REVISIONS

L&T Construction
Water, Smart World & Communication.

CLIENT: RURAL WATER SUPPLY AND SANITATION DEPARTMENT, TELANGANA.
CONSULTANT:
PROJECT: PROVIDING DRINKING WATER TO HABITATIONS IN KOMARAMBHEEM ASIFABAD SEGMENT IN ADILABAD DISTRICT (PRIMARY GRID)
SUPPLIER/CONTRACTOR: L&T Construction, Water & Effluent Treatment SBG
JOB NO: LE150883
TITLE: UTNOOR MANDAL - VADONI SUMP - 20KL
SCALE:
PROJECTION:

CHECKED BY	SIGN	DATE
CIVIL & STRUCTURAL		
MECHANICAL		
ELECTRICAL		
INSTRUMENTATION		

NAME	SIGN	DATE

DRAWING No. LE150883-C-WS-RW-DC-1432 | SCALE: A3 | REV: A

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